

PUBLIC HEALTH IN HEALTH CARE-RELATED INFECTIONS: COVID-19 CONTEXT

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Abstract: The objective was to identify you main types of infections related to health care and some types of prevention making a parallel with the trans pandemic period of COVID-19. It is a literature review, with a narrative, descriptive and reflective character, using different methodological resources to contemplate the proposed objectives. It is essential that there is a deep national discussion about what concrete action must be in the interest of the Brazilian State for the prevention of infections related to health care, especially in a pandemic context. The debate between the segments of government representation, health institutions, health workers and system users are an element key at resilience of those challenges.

Keywords: Hospital Infections; Prevention; Public health; Coronavirus infections; COVID-19.

INTRODUCTION

Infection refers to the presence of microorganisms in a certain part of the body and the immune response to the host. The first hospitals appeared in the 18th and 19th centuries. At that time, hospitals had poor hygiene conditions, used water and food of uncertain origin and there was no concern to separate patients with severe infections from patients with less serious ones. Infections spread rapidly in the hospital environment and it was common for patients to come in with a disease and end up acquiring others and dying, especially from cholera or typhoid fever. The first cases of isolation were described in England, when patients with chickenpox were isolated. After this period, the procedure became frequently adopted in hospitals (LIMA, 2007, COUTO et al., 2009).

Several studies related to the spread of infections were described between 1843 and 1867, among them, the work carried out in 1863 by Florence Nightingale, in the Crimean

War, stands out. She created several measures with the objective of reducing the risk of infection in military hospitals, where she proposed that nurses report hospital deaths as a way of evaluating services, this being the first reported case of epidemiological surveillance. The first guidelines for the use of sterile material and personal protective equipment in surgical procedures emerged in the 20th century (LIMA, 2007, COUTO et al., 2009).

The World Health Organization considers Health Care-Related Infections (HAI) as a public health problem, given this situation, the body guides health authorities to develop a system to monitor selected infections and evaluate the effectiveness of interventions. In this way, all countries that have a link with the WHO are looking for tools to control infections in their health institutions.

HAIs are responsible for most hospitalizations and hospital costs. Developing countries have a higher percentage of patients with healthcare-associated infections. Other factors can also contribute to the increase in HAIs, such as: lack of professional qualification, inadequate physical structure and lack of knowledge of prevention and control measures. In this context, WHO considers it important that health authorities assign responsibility to an agency that can carry out control and management at the national level. Cases of multidrug-resistant bacteria in hospital environments are the causes of HAI (PADOVEZE; FORTALEZA, 2014, NOGUEIRA et al, 2009).

To provide quality care, it is essential that health institutions provide safe care. Patient safety is a critical component of quality of care. Thus, it is noteworthy that among the main concerns regarding patient safety and quality of health services is the reduction of the risk of HAI incidence (ANVISA, 2013).

This study hypothesizes the greater emphasis on patient safety through the control of HAIs in the context of the new coronavirus (SARS-CoV-2) pandemic, responsible for the *Coronavirus Disease 2019* (COVID-19), considering the multifactorial scenario found, with: physical and mental exhaustion of health professionals, lack of adequate provision of personal protective equipment and other supplies, lack of infrastructure and adequate public policies.

Given the above, the objective is to identify the main types of infections related to health care and some types of prevention, making a parallel with the transpandemic period of COVID-19.

METHODOLOGY

It is a literature review, with a narrative, descriptive and critical-reflexive character with a qualitative approach.

In this bibliographic research, carried out in January 2022, we sought to sequence the situation of hospital infection and its implications in a diachronic way until reaching and emphasizing the link between hospital infections and public health, which, in turn, determined the approval of laws and regulations. guidelines for the performance of health agents and public and private health institutions.

In the first stage of the work, a bibliographic survey of scientific productions regarding the importance of public health programs in the prevention of Health Care Related Infections (HAIs) was carried out. For the elaboration of the work, published articles and indexed scientific journals, books, conference proceedings, technical reports, and other types of materials were used, using the LILACS, MEDLINE and other databases found on the Virtual Library portal at Health (BVS). Thus, the Health Sciences Descriptors (DeCS) used were: “hospital infections”,

“prevention”, “public health”, as well as their synonyms classified hierarchically.

For the selection of studies, the inclusion criteria were established: theoretical references that fit from 2006 to 2021, articles in Portuguese or Spanish with the health descriptors mentioned above and that were in accordance with the objective of the present study. As exclusion criteria: materials not available in full and free of charge and those in duplicate in the indexing databases.

In the first stage, 20 articles were found, of which only 12 were used for theoretical basis, as they fit the standards stipulated in the work. In the second part of the work, the development of the necessary arguments was elaborated, using the theoretical references as subsidies.

RESULTS AND DISCUSSION

GENERAL AND HISTORICAL REVIEW

In 1950 the United States suffered from an epidemic of *Staphylococcus aureus* bacteria very resistant to available antimicrobials. In the same year, the Center for Disease Control (CDC) created an advisory body to investigate epidemics in American hospitals. In 1958, conferences were held to discuss issues related to nosocomial infection, forms of transmission of infectious diseases, which led to the implementation of one of the main infection prevention strategies, the hand hygiene technique. With the frequent problems of hospital infections, Decree nº 77052, of January 19, 1976, was established in Brazil, which determined that no hospital institution could function at the administrative level if it did not have means of protection capable of avoiding harmful effects on the health of patients, professionals, patients and surroundings. (LIMA, 2007, COUTO et al., 2009).

Few data on nosocomial infections are published in Brazil and the lack of a Hospital Control Commission (CCIH) makes it difficult to collect national statistics. Therefore, public health programs are needed to better control HAIs. It is undoubtedly a situational problem and located in the public sphere, as it occurs in a sector exclusively existing to serve the population (MUNOZ-PRICE et al., 2015).

HEALTH CARE-RELATED INFECTIONS (IRAS) AND HOSPITAL CONTROL COMMISSIONS (CCIH)

Diseases are caused by viruses, bacteria, fungi, protozoa, helminths and prions. These need a habitat to survive that can be an individual, an animal, water, soil, etc. The transmission is made by direct contact, indirect or by projection of particles in the environment. It can occur through contaminated water and food, injectables, skin and airways. It is also important to recognize that microorganisms, when entering the body, look for an area of attachment to form colonies that may or may not cause infections. For the whole process to occur, there is a path to be traveled by microorganisms to the inside of the human body and cause diseases. The types of transmission can occur by contact, droplets (sprays), aerosols, by common vehicle and vectors (COUTO et al., 2009).

In studies carried out by Garcia et al. (2013) 44 cases of nosocomial infection by multidrug-resistant bacteria were found. Most of those infected were women, aged between 60 and 69 and the main sites of infection were the urinary tract and bloodstream. The study found an infection prevalence of 11.6%, highlighting the importance of early detection of infections and control of the spread of microorganisms, in addition to the impact on morbidity and survival of patients. After analysis, it was found that cases of multidrug-resistant bacteria have increased.

Nogueira et al. (2009), in an epidemiological survey carried out with 512 patients at a university hospital in the city of Fortaleza, Ceará, in 2008, it was observed that the prevalence rate of nosocomial infection has similar percentages for males (50.8%) and female (49.2%), but the elderly are more vulnerable due to the physiological conditions they are in, as they usually arrive at the hospital with serious illnesses and are referred to the ICU, an environment considered critical in hospital infections. Muitos estudos relatam a ocorrência de bactérias cada vez mais resistentes no ambiente hospitalar, dentre elas, destaca-se: *Acinetobacterbaumannii*, *Citrobacterkoseri*, *Echerichiacoli*, *Enterobacteraerogenes*, *Enterobactercloacae*, *Enterpbactergergoviae*, *Klebsiellapneumoniae*, *Morganellamorganii*, *Proteusmirabilis*, *Proteusvulgaris*, *Pseudomonasaeruginosa*, *Schohniurealyticum*, *Serratiamarcescens*, *Staphylococcusaureus*, *Staphylococcuschaemolyticus*, *Staphylococcusimulans* and *Staphyloxoccusxylosus* and the main route of transmission is respiratory.

According to Oliveira and Maruyama (2008) to monitor and control all situations conducive to contagion, the Hospital Infection Control Commissions, the CCIH, were created, normally managed by a nurse, in order to reduce the risks of hospital infection, being the responsible for creating protocols, and encouraging practices, such as hand hygiene by health professionals, for example, as well as controlling the use of antimicrobials, training and inspection in cleaning, disinfection of utensils and surface items, among other measures.

In 2002, in partnership with the Pan American Health Organization (PAHO), a national survey was carried out on the adequacy of microbiology laboratories in Brazil, in terms of infrastructure, human resources and inputs and equipment,

procedures, biosafety and quality control. This study classified the laboratories in quality levels, from zero to five, with the largest proportion (85.4%) reaching only the zero level, which meant that these laboratories did not even have minimum operating conditions (ANVISA, 2007, COSTA et al, 2013).

BASIS OF LEGISLATION

In Brazil, the term “hospital infection” appeared between 1960 and 1970, but from 1950 onwards the first cases of nosocomial infections were described and the concern of health professionals with the risk of infections was already common. Many publications already reported concern about postoperative infections, with the correct destination of hospital waste, with aseptic techniques and more efficient sterilization, and there was already some concern with the emergence of resistant bacteria (PADOVEZE; FORTALEZA, 2014).

In the 1970s, the first Hospital Infection Control Commission (CCIH) in Brazil was formed at Hospital Ernesto Dornelles, in Porto Alegre, Rio Grande do Sul; and later the same strategies were applied in the hospitals of the National Institute of Medical Assistance and Social Security (INAMPS), after the publication of Ordinance RRJM number pension. In 1978, the first manual for hospital infection control was translated and published, and in 1982 the *manual for Infection Control in Surgery was published* (FONTANA et al., 2006).

In 1983, Ordinance Number 196 of the Ministry of Health was published, aiming at the implementation of hospital infection control commissions in all hospitals and the adoption of a series of measures that would reduce the risks of infection. In 1987, a National Hospital Infection Control Commission was created with representatives from several states. In 1988, Ordinance Number 232 was created,

which established the National Hospital Infection Control Program and, later, the Division of Hospital Infection Control. In 1992, Ordinance Number 930 was published with the Hospital Infection Control Program, which aimed to reduce as much as possible, through systematic actions, the number of serious infections using more elaborate strategies that included norms in the operating room, cleaning, disinfection, sterilization and antiseptics of the environment (FONTANA et al., 2006).

Today, each Brazilian state is free to create actions that make it possible to reduce the risks of hospital infections, however, the formation of Hospital Infection Control Commissions is mandatory. The commission, formed by health professionals, must be responsible for planning and executing the Hospital Infection Control Program (PCIH), following actions that reduce the incidence of infections. In Brazil, with the death of President Tancredo Neves due to a post-surgical infection, there was great concern about implementing infection control measures in the country. In this context, a hospital infection control manual was published with the aim of establishing infection prevention and control strategies in hospitals (GARCIA, et al., 2013).

With Ordinance Number 232 of the Ministry of Health, the National Program for Hospital Infection Control was created, which aims to survey municipal data relating strategies used in cases of hospital infections, multidrug-resistant microorganisms and outbreaks in health services. In 1989, the First Brazilian Congress on Hospital Infection was organized by the São Paulo Association of Studies in Hospital Infection Control (APECIH) to disseminate knowledge among health professionals (LIMA, 2007).

In the 1990s, the term “hospital infection” was changed to “Health Care Related Infections” (IRAS), in which the idea of

this designation was the expansion of this understanding, which from that moment was incorporated into infections obtained and associated with care and assistance provided in any type of environment.

Through the growth of circumstances that lead people to hospital in increasingly severe and immunocompromised conditions, in addition to antibiotic resistance, HAIs ended up gaining relevance for public health. In 1997, Law Number 6431 was enacted, requiring all Brazilian hospitals to have a CCIH that operates with hospital infection control programs. In 1998, Ordinance Number 2616 of the Ministry of Health was published with rules for the execution of actions and adjustments to the new Federal Law. In 1999, the National Health Surveillance Agency (ANVISA) was created, which, in addition to regulating the manufacture of food and hospital supplies, is responsible for controlling hospital infections at the federal level, providing support to all health departments in the States (LIMA, 2007).

PREVENTIVE MEASURES

Four clinical syndromes are responsible for most HAIs: central vascular catheter-associated blood infection (CVC), urinary tract infection (UTI) associated with indwelling urinary catheter, surgical site infection (SSI), and ventilator-associated pneumonia. mechanics (PAV). Considering that most infections are associated with invasive devices and surgical procedures, these are priority targets of infection prevention and control measures, as they are considered risk factors that can be modified/intervened in the reduction of HAIs (ANVISA, 2013a).

Each organization determines which infection sites, epidemiologically important agents, and infection-associated devices and procedures will be the focus of infection prevention and reduction (ANVISA, 2013a).

Although there are many recommended measures for the prevention and control of HAIs, hand hygiene must be highlighted, as this is considered the most important measure, in addition to being the simplest and most effective to be performed (JARDIM, 2011).

However, the lack of adherence of health professionals to this practice is a verified reality and a challenge for the infection control team. In a study carried out at the University Hospital of Geneva, the adherence of professionals to the practice of hand hygiene was considered moderate, with an average of 48% of application of the measure in the opportunities generated during the workday. The main cause of not performing hand hygiene was the lack of attention to the need (JARDIM, 2011).

Couto et al., (2009) highlights that hand washing is the most important and effective way to reduce the microbial load and prevent the transmission of pathogens from one patient to another. To ensure the hygiene of the hands of health professionals in hospitals, it is important to provide washbasins with running water at strategic and accessible points, with soap and paper towels, and the technique must be described in explanatory tables in all sectors. In 1989, the Ministry of Health edited and standardized the manual with the hand washing technique in Brazilian health institutions. Ordinance 2616 of 1998 recommends the technique of hand hygiene in order to control infections. Before the procedure, it is necessary to remove jewelry, rings, bracelets, watches and any piece that can accumulate microorganisms and check that the nails are short and without nail polish.

The first realization of the importance of hand hygiene was in 1847, by the Hungarian doctor Ignaz Philipp Semmelweis, who, by instituting the simple act of washing hands with soap and water, reduced the number of

deaths of parturients from puerperal fever in a hospital in Vienna. Since then, it has been adopted as a primary measure to control the transmission of nosocomial infections.

The Regional Council of Medicine of São Paulo (CREMESP) in partnership with the Public Ministry of São Paulo found in a survey that 90% of the 158 hospitals evaluated had poor hospital infection control. In the study, the Commission and Program for the Control of Hospital Infections, areas of critical procedures; material sterilization center and Biosafety. The study has become an important instrument for assessing failures and controlling HAIs (CREMESP, 2010).

Oliveira et al. (2009) found that in a group of 102 health professionals, only 36.3% had the necessary knowledge regarding hospital infection control measures. It was found that there are differences in knowledge between the professional categories, probably due to training and lack of training. Low adherence to precautionary measures against infections was observed, probably due to aspects of human behavior, lack of risk perception and underestimation of individual responsibility for the increase in infection rates.

It must be noted that the prevention and control of HAIs are:

[...] essential elements in patient safety. Reducing the risks of preventable HAIs requires a major change in culture, attitude and approach to patient care. For these changes to occur, it is necessary to clearly understand which factors increase the patient's risk of acquiring the infection and how/where improvements in structure, organization and care practices can reduce this threat and increase patient safety (ANVISA, 2013).

From the above, and in the development of the work, until the 80's Brazil did not have a vision or a concern about HAI, it was something that came from international studies and the WHO itself.

According to the WHO (World Health Organization) 1.4 million infections occur at any given time in underdeveloped and developed countries. About 2 million healthcare-associated infections occur annually in the United States, resulting in 60,000 to 90,000 deaths, with between 5% and 15% of hospitalized patients developing HAIs. In Brazil there is no precise estimate due to the lack of systematization of accurate information (OLIVEIRA et al., 2009).

Qualified and informed professional training is necessary since graduation, because with the anticipation of the problem with preventive measures, the risk factor will decrease. And along with professional training, there is the issue of professional appreciation that encourages the agent of the health institution to keep up to date in a process of continuous training and satisfaction in the performance of their daily tasks.

It is essential that there is a deep national discussion about what must be the concrete action of interest of the Brazilian State for the prevention of HAIs. The debate between the segments of government representation, health institutions, health workers and system users is a key element in overcoming these challenges.

The “institutional structure” itself still brings with it administrative problems that further aggravate the problem. If there were a more accentuated demand to the directors of the institutions, perhaps we would not have an overload of work of the nursing professionals, which directly reflects on the quality of the infection control actions, as well as the turnover of employees, which prevents advances in the processes that are being carried out. being deployed for the purpose of promoting infection control.

COVID-19 CONTEXT

And in the midst of the fight against hospital-acquired infections, multidrug-

resistant bacteria, institutional protocols and guidelines, and training, another obstacle arises, but of an unimaginable proportion: a new virus, the new coronavirus (SARS-CoV-2), which results in a pandemic.

And how to deal with an unknown virus, with a high rate of transmissibility, without proven treatment, without a vaccine? It was exactly in this scenario that Brazil and hundreds of countries found themselves in the first half of 2020. According to a study carried out by the Johns Hopkins University (2020), until March 6, 2020, the data pointed to 100,625 confirmed cases and 3,411 deaths. by COVID-19 worldwide, which is known to be necessary to still consider underreporting. Its lethality rate was around 0.5 to 4%, which is worrying when compared to the Spanish Flu rate of 2 to 3% (SILVA, 2020).

Term widely heard in this pandemic, the rapid and large spread has some reasons, reasons that were diagnosed in the first half of 2020, such as: the lack of agility to test suspected cases, the delay in delivering results, little availability of types and number of exams, as well as low availability of laboratories to meet the very high demand, failure in personal protective equipment from wrong handling and lack of necessary quantity, absence of protocols for screening, care and isolation, among others (SILVA, 2020).

Given the pre-pandemic scenario, was it already worrying in relation to HAI, and in the transpandemic period? For it is not just dealing with infection control of one kind, but trying to insert a protocol that fits all cases, not forgetting that admitted and hospitalized patients, in addition to the new coronavirus, can acquire other infections. And if, in doubt, the Hospital Infection Control Commissions played a major role in this pandemic, together with the Patient Safety Centers and Continuing Education

Centers (CAMPOS; GOMES; ALVES; MOREIRA; FIGUEIREDO, 2020).

In July 2020, the Instituto de Medicina Integral Prof. Fernando Figueira (IMIP) published guidelines for the prevention and control of infections related to health care in patients suspected and confirmed of infection by the new coronavirus, which the main measure includes: hand hygiene performed in five moments, being: before procedure, before contact with the patient, after exposure to body fluids, after contact with the patient, after contact with areas close to the patient; protocol for preventing the transmission of diseases and controlling the spread of multidrug resistant (MDR), extremely resistant (XDR) and pan-resistant (PANR) bacteria in the hospital environment; clinical protocol of bloodstream infection associated with peripheral and central vascular accesses: prevention and treatment; clinical protocol of non-associated and ventilator-associated pneumonias: prevention and treatment; clinical protocol for urinary tract infection associated with indwelling urinary catheter: prevention and treatment; guidelines on the device exchange period; hospital cleaning protocol; intra-hospital transport guidelines; management guidelines with medical records; guidelines for the use of personal protective equipment; dressing and undressing guidelines (SILVINO; SOUZA; ALVES; FERRAZ, 2020).

It is emphasized that the transmission of SARS-CoV-2, novel coronavirus, occurs:

[...] mainly through respiratory droplets produced when an infected person coughs or sneezes, spreading in a similar way to influenza viruses and other respiratory pathogens. These droplets can reach a distance of 1 meter. Indirectly, contamination of hands can occur through contact with contaminated surfaces. Another form of dissemination is transmission by aerosols in patients undergoing procedures performed

in the airways, such as orotracheal intubation, aspiration and bag-mask ventilation (SILVINO; SOUZA; ALVES; FERRAZ, 2020, p. 14).

As much as the nuclei and sectors of health and hospital units have done more than possible, it is not totally under their control, as an example of this circumstance, there is one of the main factors: personal protective equipment and its correct management. The attire must be performed in the following order: hand hygiene with soap for 40 seconds or with 70% alcohol for 20 seconds; put on a gown (in case of a sterile procedure, perform this step at the end); put on a mask, check the seal, when to reuse it, after touching it, wash your hands; put the cap over the elastic of the mask and covering the ears; put on face shield or glasses; put on the glove with tape to fix it better (if using sterile gloves, the tape is not necessary). For undressing, the following steps are followed: remove the apron at shoulder height, remove it with the glove, making the smallest volume possible and discard in infectious waste; sanitize hands; with clean gloves, remove the face shield from the sides and disinfect the inside and then the outside with the disinfectant recommended by the CCIH; remove gloves and sanitize hands; remove the cap from behind; use the strips, not touching the mask and store inside the paper; hand hygiene (SILVINO; SOUZA; ALVES; FERRAZ, 2020).

The theory was presented above, however, in practice, mental and physical exhaustion, professional absences, sick leaves, high demand for patients/procedures/intercurrences, changes in protocols and guidelines with each advance of science, lack of supplies, mainly the necessary amount of PPE to carry out a safe, damage-free assistance.

FINAL CONSIDERATIONS

For greater control of hospital infections, important actions can be highlighted, such as an increase in government investment for the health portfolio, surveillance and control policies for epidemic infections through CCIHs and programs for adherence to precautionary measures and the use of PPE (Personal Protective Equipment), training of health professionals highlighting individual and collective responsibilities in prevention. Adherence to hand hygiene by health professionals needs to be a conscious and constant attitude, as the simple act of washing hands correctly, which takes 40 to 60 seconds, reduces hospital infections and mortality.

Hospital infections are the biggest cause of death of patients hospitalized in Intensive Care Units and the nurse in this specific field dominates knowledge that goes beyond day-to-day tasks, so the frequent updating of these professionals is essential, demonstrating the total importance of participation and quality of care provided by the nursing team to the patient in order to reduce hospital infection, showing the indispensability of developing plans and control practices for professional improvement.

The Hospital Infection Control Commission plays a fundamental role in the control of infections, evaluating the rates in constant research, added to the hygiene techniques with permanent monitoring, it is possible to reduce the number of cases of occurrences of HAI infections.

With this present review, the importance of hand asepsis became clear. The use of gel alcohol in the swine flu epidemic alerted the population to the risk of contamination, but it is very important to know the dimension of the problem of contamination in public places, in particular, in hospitals, especially with the learning of this transpandemic period of the new coronavirus.

The knowledge of the dangers inherent in the carelessness of a simple item that can cost the loss of life is something to think about and act on. The solution to a problem is always structured through a study, observations, analysis and, if possible, proof tests. But the heterogeneity of a nation transforms the epidemic/pandemic problem into an almost impossible challenge to deal with, as there are several variables that challenge the creation of fixed regimens. The mitigating solution is information and compliance with minimum hygiene parameters.

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